



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,316	03/16/2004	Renjie Zhou	00104-CON	1990
29050	7590	06/29/2005	EXAMINER	
STEVEN D WESEMAN, ASSOCIATE GENERAL COUNSEL, IP CABOT MICROELECTRONICS CORPORATION 870 NORTH COMMONS DRIVE AURORA, IL 60504			OJINI, EZIAMARA ANTHONY	
		ART UNIT		PAPER NUMBER
				3723

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/801,316	ZHOU ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Anthony Ojini	3723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 16 March 2004.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-13 and 34-36 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-13 and 34-36 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
     1. Certified copies of the priority documents have been received.  
     2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
     3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/16/04, 2/18/05</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

Applicant's cancellation of claims 14-33 and 37-44 filed 3/16/04 is acknowledged.

### ***Claim Rejections - 35 USC § 112***

Claims 1-13, 34-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**In claim 1**, line 5, change the expression "*wherein the boric acid and conjugate base are not present together*" to --- **wherein either the boric acid or conjugate base is not present -----.**

**In claim 34**, line 7, change the expression "*wherein the boric acid and conjugate base are not present together*" to --- **wherein either the boric acid or conjugate base is not present -----.**

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6-9, 12, 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scherber et al (5,858,813 A) in view Huynh et al. (6,190,237 B1).

**With respect to claims 1, 2,** Scherber et al. disclose a chemical mechanical polishing system comprising a metal oxide abrasive, polishing pad, organic acid, base salt (form of a conjugate base salt); and an aqueous medium (see abstract, and column 5, lines 1-42).

Scherber et al. fail to disclose boric acid and wherein either boric acid or conjugate base salt is not present in the polishing system in a substantially amount to act as a pH buffer.

Huynh et al. disclose a slurry composition containing boric acid (see col. 2, lines 51-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide apparatus of Scherber et al. with slurry containing boric acid in view of Huynh et al. so as to act as a complexing agent that can prevent precipitation of insoluble metal hydroxides which in turn can cause scratches on the underlying silicon wafer.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide apparatus of Scherber et al. with boric acid or conjugate base salt that is not present in the polishing system in a substantially amount **so as to act as a pH buffer**, since it has been held that the provision of adjustability, where needed, involves only routine skill in the art. *In re Stevens*, 101 USPQ 284 (CCPA 1954).

**With respect to claims 3, 4,** Scherber et al. disclose the abrasive is selected from the group consisting of alumina, silica, titania, ceria, zirconia, germania (see col. 3, lines 27-29).

**With respect to claim 6**, Scherber et al. disclose the abrasive is in particulate form and is suspended in medium (see col. 2, line 35).

**With respect to claim 7**, Scherber et al. disclose water may be used as effective oxidizing agent in slurries (see col. 5, lines 14-15).

**With respect to claims 8, 9**, Scherber et al. disclose peroxide oxidizing agent (see col. 2 line 35 & col. 5, line 11).

**With respect to claim 12**, Scherber et al. fail to disclose the optimum value as claimed by the applicant.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide apparatus of Scherber et al. with the optimum value as claimed by the applicant, **so as to maintains in a range suitable for it's intended use**, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

**With respect to claims 34, 35**, Scherber et al. disclose a method of polishing a substrate comprising the following steps: contacting a substrate with a chemical mechanical polishing system comprising a metal oxide abrasive, polishing pad, base salt (form of a conjugate base salt); and an aqueous medium (see abstract, and column 5, lines 1- 42); and abrading at least a portion of the substrate to polish the substrate. Scherber et al. fail to disclose boric acid and wherein either boric acid or conjugate base salt is not present in the polishing system in a substantially amount to act as a pH buffer.

Art Unit: 3723

Huynh et al. disclose a slurry composition containing boric acid (see col. 2, lines 51-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide apparatus of Scherber et al. with slurry containing boric acid in view of Huynh et al. so as to act as a complexing agent that can prevent precipitation of insoluble metal hydroxides which in turn can cause scratches on the underlying silicon wafer.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide apparatus of Scherber et al. with boric acid or conjugate base salt that is not present in the polishing system in a substantially amount **so as to act as a pH buffer**, since it has been held that the provision of adjustability, where needed, involves only routine skill in the art. *In re Stevens*, 101 USPQ 284 (CCPA 1954).

**With respect to claim 36**, Scherber et al. disclose metal layer that comprises tantalum (col. 5, lines 37-38).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scherber et al. in view of Rutherford et al. (5,692,950).

**With respect to claim 5**, Scherber et al. fail to disclose the abrasive is fixed on a polishing pad.

Rutherford et al disclose a fixed abrasive polishing pad (see abstract & fig. 1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide apparatus of Scherber et al. with fixed abrasive polishing pad in view of Rutherford et al. so as to ensure that removing some of the particles at

Art Unit: 3723

the surface during planarization exposes additional abrasive particles capable of performing the planarization function.

Claims 10,11,13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scherber et al. in view of Kaufman et al (5,954,997).

**With respect to claims 10,11,** Scherber et al. fail to disclose an azole film-forming agent.

Kaufman et al. disclose a film-forming agent such as imidazole, benzotriazole, benzimidazole and benzothiazole (see col. 5, lines 44- 53).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide apparatus of Scherber et al. with an azole film-forming agent in view of Kaufman et al. so as to facilitate the formation of a passivation layer of metal oxides and dissolution inhibiting layers on the surface of the metal layer.

**With respect to claim 13,** Scherber et al. fail to disclose a complexing agent.

Kaufman et al. disclose a complexing agent.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide apparatus of Scherber et al. with a complexing agent in view of Kaufman et al. so as to disturb the passivation layer of metal oxides during the mechanical abrasion step without destroying the layer.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Ojini whose telephone number is 571 272

4492. The examiner can normally be reached on 7 to 4 Tuesday-Friday with every other Monday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Hail can be reached on 571 272 4485. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

